

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

UNITED STATES' PRE-TRIAL MEMORANDUM

Hurricane Harvey was the greatest single rainfall event in United States history. The National Weather Service concluded that the storm was a 1,000-year event. Harris County Flood Control District determined that, for Harris County, the storm's maximum rainfall over a four-day period had a return interval exceeding 5,000 years in most locations. Over the Addicks and Barker watersheds where the Test Properties are located, the return interval for a rainfall event of Harvey's magnitude is estimated at more than 770 years. The historic amounts of rainfall resulted in widespread flooding throughout the greater Houston region.

In the 1940s, the United States Army Corps of Engineers constructed the Buffalo Bayou and Tributaries Project west of downtown Houston in response to the worst storm on record. That project, which includes the Addicks and Barker Reservoirs, has long protected the City of Houston from catastrophic flooding during major storm events. Consistent with the approved water control manual that guides dam operations, the Corps closed the gates at the outlet structures on the evening of August 25, 2017. Over the next several days, Hurricane Harvey dropped more than 30 inches of rain (approximately 80 percent of the average annual rainfall) over the watersheds that drain into those reservoirs. That rainfall flooded many properties

upstream and downstream of the reservoirs and also resulted in the largest pool of water behind the dams ever recorded.

As the storm progressed, water levels upstream of the dams continued to increase and the Corps responded in accordance with its water control manual. On August 28, the Corps initiated downstream releases (termed “induced surcharge releases”) to make room in the reservoirs for additional rainfall and to protect the integrity of the dams. Although many properties downstream of the reservoirs flooded as a result of the massive storm, the downstream flooding would have been far worse in the absence of the Addicks and Barker dams. Conversely, some properties upstream of the dams would have flooded if the dams’ gates had never been closed and some upstream properties would have flooded even if the dams had never been built.

The Court docketed the first Hurricane Harvey-related lawsuit on September 5, 2017, even before the floodwaters fully receded. *Y & J Props., Ltd. v. United States*, No. 17-1189 (filed Sept. 5, 2017). Hundreds of additional complaints followed. Then-Chief Judge Braden eventually split the cases into upstream and downstream subdockets, and Test Properties were identified by the Court in each. The Court, *sua sponte*, bifurcated proceedings into liability and just compensation phases and adopted an abbreviated schedule for fact and expert discovery. The Court recently cancelled previously-scheduled liability trials in the respective subdockets as a result of the Government shutdown that commenced on December 21, 2018. *See* ECF No. 195; *see also* No. 17-9002, ECF No. 154.

Plaintiffs in this subocket allege the United States took property without compensation required by the Fifth Amendment as a result of the Corps’ construction and subsequent operation of the Addicks and Barker dams. Their claims fail for several reasons. First, Plaintiffs cannot

state a viable claim for relief because flooding on their properties was a one-time, temporary event resulting from a historically-large storm.

Second, the Corps' actions constituted an exercise of governmental power to prevent loss of life and far worse damage to private property, including the extraordinary disruption to businesses and personal lives of all persons in the greater Houston area from unchecked flooding. That type of government action—an exercise of sovereign police power calculated to address an inevitable public harm—does not amount to a taking of property compensable under the Fifth Amendment.

Third, Plaintiffs' claims fail because the claimed losses were not the natural, direct, or probable result of the dams at the time the Corps constructed them in the 1940s.

Fourth, Plaintiffs' claims fail because they lack a compensable property interest to be free of floodwaters generated during a hurricane.

Fifth, Plaintiffs' claims fail with respect to Test Properties that would have flooded in the absence of the pertinent government action.

Finally, Plaintiffs' claims fail under the multi-factor test established in *Arkansas Game and Fish Commission v. United States*. Evidence will show that the character of Plaintiffs' properties and the reasonable investment-backed expectations prongs support a finding of no liability because the Test Properties are naturally prone to flooding and located in areas long subject to controlled inundation due to their proximity to the reservoirs. The flooding on Plaintiffs' properties caused damage, but the severity and duration prongs favor a finding of no liability because Hurricane Harvey was an extremely rare event and did not change the nature of Plaintiffs' property. The United States, therefore, should not be found liable under *Arkansas Game and Fish Commission*.

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I. Factual Background

A. The Corps Built the Addicks and Barker Reservoirs, in Cooperation with Local Interests, to Reduce Flood Risks in the City of Houston and at the Houston Shipping Channel

The United States constructed Addicks and Barker dams more than 70 years ago, decades before the Test Properties were developed or purchased by Plaintiffs. Because many of the early facts occurred decades ago, the United States expects to present this evidence via historical documents and the testimony of Robert Thomas, Chief of the Corps' Galveston District Engineering and Construction Division, who understands this history and the relevant government documents.¹

1. The Impetus for the Buffalo Bayou and Tributaries Project

The City of Houston, located in Harris County, Texas, is the most flood prone city in the United States. There are twenty-two watersheds in Harris County, each of which drains rainfall or storm water runoff to a primary creek or waterway and, eventually, to Galveston Bay in the Gulf of Mexico. The region is remarkably flat. The three watersheds at issue in this case are the Addicks Reservoir watershed, the Barker Reservoir watershed and Buffalo Bayou watershed. All three naturally drain into Buffalo Bayou, which moves through the center of the city and naturally floods during high rainfall events. Houston is also close to the Gulf of Mexico, where hurricanes and tropical storms develop regularly.

When the Corps designed and constructed the dams, a December 1935 storm was the largest storm to have hit the Houston area in the modern era. The flooding resulting from that storm caused eight deaths and millions of dollars of property damage in the City of Houston.

¹ The United States may also call Jonathan Jones, P.E., P.H., Chief Executive Officer of Wright Water Engineers, Inc., an expert engineer, to testify, among other issues, about the accepted meaning and use of some of the engineering terms discussed below.

In an effort to mitigate Houston’s natural flooding risks, Congress in 1938 authorized construction of the Addicks and Barker Reservoirs as part of the Buffalo Bayou and Tributaries Project (“Project”). The Corps developed the Project with input from several local interests, including the Harris County Flood Control District (“HCFCD”).

The Project contemplated construction of three reservoirs, a system of canals and levees, and channel rectification along Buffalo Bayou. The Project was designed to be built in stages over time, but several Project components were never constructed, largely due to available funding and rapid development in the area. 1940 Buffalo Bayou Definite Project Report (“1940 Definite Report”) at USACE129504.

2. Construction of the Dams

The Corps constructed Addicks and Barker dams to the west of the City of Houston in the mid-1940s. The reservoirs serve as “detention basins and were designed to collect excessive amounts of rainfall which would then be released into Buffalo Bayou at a controlled rate” to reduce flood risks to downstream properties. 2009 Master Plan for Addicks and Barker Reservoirs (“2009 Master Plan”) at USACE016051.

Consistent with then-accepted Corps’ policies and engineering principles, the Corps determined how much property to purchase upstream of the dams by reference to the “most intense storm to visit the basin during the period of record”—the 1935 Storm. 1940 Definite Report at USACE12508. Though engineers did not use the term in the 1940s, modern engineers now refer to such a storm as the Standard Project Storm, which produces a Standard Project Flood, often shortened to “SPF.” The Corps’ 1940-era planning documents “proposed to acquire lands in Addicks and Barker Reservoirs to an elevation 3 vertical feet above the pools which would be produced by the 1935 storm transposed over each watershed.” *Id.* at USACE129527.

Because of the acute consequences of a dam failure, dams are engineered to withstand hypothetical storms much larger than the SPF. Though not in use in the 1940s, modern engineers now refer to such a hypothetical storm as the “Spillway Design Storm,” which produces a “Spillway Design Flood,” often shortened to “SDF.” The Corps designed Addicks and Barker dams not to fail catastrophically during a hypothetical SDF storm with rainfall over the Addicks and Barker Reservoirs like a massive storm that occurred over Hearne, Texas, in 1899. *See id.* at USACE129909. While physically possible, the Corps stated in the 1940s that the likelihood of a Hearne-like storm occurring in the Buffalo Bayou basin was “very remote,” and not likely to occur “more than once in the lives of these structures.” *Id.* at USACE129510, - 27. The SPF and SDF calculations have changed over time, and the current SDF has a probability of occurring approximately once in 179,000 years for Addicks Reservoir and once in 135,000 years for Barker Reservoir. *See* 2013 Dam Safety Modification Report at USACE065070, USACE065074.

At the time of the dams’ construction, the upstream properties were used primarily for ranching or rice farming. Using the then-applicable elevation datum,² the following describes the known data immediately prior to construction:

Reservoir	1935 Storm (effectively the SPF) (ft.)	Acquisition (ft.)	Design Storm (effectively the SDF) (ft.)
Addicks	101.4	104.4	108.3
Barker	95.3	98.3	101.7

Id. at USACE129526.

² Elevation data is measured against a zero-elevation reference point known as a “vertical datum.” The datums used by surveyors have changed over time and are often adjusted to account for local conditions. Historic elevation data discussed here are as reported in the Project documents and are not comparable among different vertical datums.

The Corps finished construction of the dams in 1948. The Project originally contemplated construction of a Cypress Creek levee, which would have prevented overflow from Cypress Creek into the Addicks watershed. Addicks Reservoir receives approximately one-third of its total volume from the Cypress Creek Basin during major flood events. *See, e.g.*, 2012 Addicks and Barker Reservoirs Water Control Manual (“2012 Water Control Manual”) at USACE662093. Because the Cypress Creek levee and other planned components were not built, the Corps acquired more property upstream of Addicks Reservoir in the 1940s than it had originally contemplated to account for the additional inflow. The Corps reported the following information in a 1955 Reservoir Regulation Manual:

Reservoir	Standard Project Flood (ft.)	Acquisition (ft.)	Maximum Design Water Surface Elevation (effectively the SDF) (ft.)
Addicks	104.0	108	113.8
Barker	96.7	98.3	104.8

Addicks and Barker Reservoirs Regulation Manual (“1955 Manual”) at USACE284671. Thus, after construction, the Corps owned more than enough property upstream of the reservoirs to accommodate a pool created by the 1935 storm, the worst storm that had ever been observed to impact this area.

As constructed, Addicks and Barker dams are elongated “U-shaped” earthen embankments, approximately 13.6 miles and 11.5 miles long, respectively, and rising approximately 48 and 36 feet above the stream bed at their highest points, respectively. The reservoirs lie north and west of the confluence of Buffalo Bayou and South Mayde Creek, near the western edge of the Houston city limits. The majority of Addicks and Barker Reservoirs fall within Harris County, but a small portion of Barker Reservoir crosses into Fort Bend County.

3. Gating of the Dams' Conduits

Addicks and Barker dams do not impound water, except for short durations during periods of heavy rainfall. Each dam has five conduits. In the 1950s and 1960s, the Corps gated these conduits to provide additional protection to downstream properties, which had undergone significant development after the Corps constructed the dams.

With the gates in place, the Corps issued a revised reservoir regulation manual in April 1962. *See* 1962 Addicks and Barker Reservoir Regulation Manual (“1962 Manual”) USACE011626. Among other elements, the 1962 manual reassessed the SPF and SDF at the two reservoirs, with the inclusion of the gates:³

Reservoir	Standard Project Flood (ft.)	Acquisition (ft.)	Spillway Design Flood (ft.)
Addicks	104.8	108	114.6
Barker	97.7	98.3	106.4

See id. at USACE011634. Thus, analyses conducted in the 1960s concluded that, even after gating all of the conduits and updating the hydrologic analysis, the Corps owned more than sufficient property to accommodate anticipated impoundment during the worst storm on record that had ever hit the area transposed above the dams.

B. The Corps' 1977 Hydrology Report

In May 1977, the Corps released a new hydrology report in response to concerns about increased urbanization near the reservoirs, changes in design criteria, and observations of more intense storms occurring after dam construction. The 1977 Hydrology Report explained that due to the “size and critical location of the Addicks and Barker Reservoirs,” and new knowledge of

³ The 1962 manual calculated a different SPF based on a hypothetical storm that resulted in slightly larger flood volumes than the 1935 storm. *See* 1962 Addicks and Barker Reservoir Regulation Manual, USACE011664.

storms and improved engineering abilities, the Corps would use different engineering techniques and a much larger hypothetical storm to calculate the hypothetical SPF and SDF. 1977

Hydrology Report at USACE234623.⁴

The new methodology for determining the SPF and new calculations meant that the newly-determined hypothetical SPF would create a pool that would exceed the limits of government-owned land. The Corps' 2014 Emergency Action Plan for Addicks and Barker Reservoirs ("2014 Emergency Action Plan"), which relied on the 1977 Hydrology Report, summarized the following:

Reservoir	New SPF Calculation (50 percent of the PMP rainfall) (ft.)	Acquisition (ft.)	New SDF Calculation (one-half of PMP, followed five days later by PMP) (ft.)
Addicks	107.5	103	115
Barker	99	95	108

See id. at USACE019883. The new analysis also stated that the "present dams are potential safety hazards in light of present day engineering standards, and thus, do not meet Corps . . . criteria for dam safety." 1984 General Design Memorandum at USACE013568.

In the late 1970s and early 1980s, the Corps considered various proposals to address the risk to downstream properties associated with dam safety and flooding concerns associated with the new SPF and SDF recalculations. The Corps considered, among other proposals, acquiring additional upstream land. Ultimately, however, the Corps focused instead on completing an immediate fix of the unsafe dam structure.

⁴ The 1977 Hydrology Report based this storm on an analysis of a Probable Maximum Precipitation ("PMP"), the "theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year." 1984 Addicks and Barker Dams General Design Memorandum ("1984 General Design Memorandum") at USACE013571. That storm was expected to occur extraordinarily rarely, approximately once in more than 1,000 years. *Id.*

In 1981, the Corps informed the public of its plan to implement an interim solution and move towards a permanent solution. The Corps' November 19, 1981 news release, which discussed the proposed plans, "received wide publicity throughout the Houston Metropolitan area and its surroundings," and strong public opposition to certain proposals. *Id.* at USACE013574. More specifically, there was "strong public concern in opposition to Plan I[,] a proposal to degrade the ends of the reservoir so that the dams could hold back less water. *Id.* at USACE013574-75. "Additionally, a segment of the public who objected to Plan I did not appear to be convinced that the threat of a statistical infrequent storm such as the SDF warranted acceptance of the attendant disadvantages of Plan I." *Id.*

The Corps eventually developed an alternative plan (known as Plan V(b)). That plan, which the Corps implemented, raised portions of the main embankments of the dams and placed roller-compacted concrete on the dams' spillways at the existing elevation to improve dam safety. That work did not increase the maximum impoundment the reservoirs can hold without failure. Nor did those improvements increase in any way the likelihood of a natural disaster like Hurricane Harvey occurring.

C. Upstream Development

After construction of the dams, developers converted much of the agricultural land upstream of the reservoirs into residential subdivisions. This development was approved by counties in which the subdivisions are located, pursuant to local regulations and requirements. Andrew Ickert, a professional engineer with Halff Associates, Inc., studied, and may testify at trial about, the significant changes in development upstream and downstream of the reservoirs since the 1940s.

The feasibility of several upstream development projects depended explicitly on the existence of Addicks and Barker Reservoirs and the Corps' willingness to approve projects to accommodate drainage within the two reservoirs. *See* 1995 Reconnaissance Report ("1995 Report") at USACE015144. The Cinco Ranch Development, for example, lies upstream of Barker Reservoir in Fort Bend County. In 1986, the Corps granted two easements to the Willow Fork Drainage District for a new drainage channel into Barker Reservoir and improvements to the existing Willow Fork channel. These easements "facilitat[ed] the development of certain lands upstream of Barker Reservoir. Without construction of the diversion channel, frequent flooding would render these upstream lands undevelopable." Easement No. DACW64-2-86-17 at FB0025602; Easement No. DACW64-2-86-18 at FB0025621. A 1984 Environmental Assessment for that project noted that the existing topography of the Cinco Ranch development "is nearly level and, as a result, land areas adjacent to and upstream of Barker Reservoir are subjected to frequent flooding events." Environmental Assessment for Proposed Willow Fork Diversion Channel at USACE750430. The area to be developed was "characterized by numerous wetted depressions," some of which were "semipermanently to permanently flooded." *Id.* at USACE750436-48. The Environmental Assessment noted that the project would "remove approximately 1,740 acres of the proposed development from the 100-year floodplain." *Id.* at USACE750430. The properties owned by Plaintiffs Micu, Banker, and Giron lie just to the west of the government-owned land within Barker Reservoir, well-within the area that benefitted significantly from these projects.

The Corps granted easements to improve other channels that drain into Barker Reservoir. For example, the Corps granted an easement to Harris County to allow diversion of Mason Creek into Barker Reservoir, which would have otherwise flooded the Kelliwood neighborhood west of

the reservoir. The Environmental Assessment for this channel improvement project addressed the “severe flooding [that had] occurred in the Nottingham Country subdivision located along Mason Creek just upstream of the Barker Reservoir boundary” in August 1981. Environmental Assessment for Proposed Improvements for Mason Creek at USACE517776. The Environmental Assessment noted that the project would “reduce the flood hazard and improve drainage in developed areas upstream of the Barker Reservoir boundary,” and that without the project, “upstream flooding would continue to occur.” *Id.* at USACE517779, -87.⁵ The property owned by Plaintiff Popovici lies just to the south of Mason Creek and west of the government owned land within Barker.⁶

The Corps also granted easements for drainage channels and improvements into Addicks Reservoir. For example, an easement to facilitate drainage of Langham Creek and Horsepen Creek into Addicks Reservoir was “vital to controlling flooding in the area.” Letter from HCFCD at USACE613657-58. In August 1981, major flooding caused water in Langham and Horsepen creeks to flood property outside of the boundary of Addicks Reservoir, including several homes in the Bear Creek Village subdivision. That easement, and others approved by the Corps, significantly improved drainage from the Bear Creek Village, which encompasses (or is close to) the Test Properties of Burnham, Stewart, Turney, and Sidhu.⁷

⁵ HCFCD noted that the then-existing “Mason Creek channel within Barker Reservoir is extremely inadequate to convey existing flood flows which results in damaging backwater effects on existing subdivisions immediately upstream of Barker Reservoir.” 1983 Proposed Improvements for Mason Creek at USACE522968.

⁶ The Corps also granted an easement to Harris County for a drainage ditch into the Barker Reservoir on a channel called Tributary 52.9 to Buffalo Bayou, which provided drainage relief near Plaintiffs Popovici and Soares properties. The Corps allowed drainage channels into the larger improved channel to accommodate new developments and prevent flooding, which could not otherwise be justified economically.

⁷ These projects prevent flooding in the Bear Creek Village subdivision and, when not properly maintained by the County, result in flooding in streets and homes. The Corps also granted an

D. Information About the Risk of Flooding Was Publicly Available and Upstream Plaintiffs Knew or Should Have Known of the Potential for Upstream Flooding Decades Ago

Even with the improved drainage afforded by the Project, the upstream properties are subject to flooding during unusual storm events. The upstream Plaintiffs knew or should have known of the potential for upstream flooding years before Hurricane Harvey struck due to past storms, public documents, newspaper articles, and public meetings. Dr. Galloway, a Professor of Engineering at the University of Maryland, reviewed the available information and will show that “at the time of Plaintiffs’ acquisition of the test properties, sufficient indicators were available for a buyer to determine that the properties would be prone to flood in a Hurricane Harvey-like event.” Galloway Expert Report at 5.

1. The March 1992 Storm

In March 1992, a large storm hit the Houston area, dropping up to 10 inches of rain in portions of western Houston. The storm caused Barker Reservoir to fill to approximately 93.60 feet, or 80 percent of the capacity of the government-owned land. Although the pool did not leave government-owned land, the event raised public concern about possible future events: “As the extent of the flooding became known through the media there was a public concern not only for the flooding that occurred but also for the areas that almost flooded. This included the privately owned land inside the reservoirs at an elevation just beyond that owned entirely, or in fee, by the Government.” 1995 Report at USACE015195; *id.* at USACE015138 (explaining further that the 1992 storm “produced concern in a segment of the public, the local sponsor, the

easement to Harris County to develop a bypass channel into Addicks Reservoir near the West Houston Airport Test Property. Success of that project hinged on the Corps’ easement.

Galveston District, and the Southwestern Division,” by revealing “the extent of the flooding problem . . .”).

The Corps discussed the possibility of upstream flooding with the public and local governments, including Fort Bend and Harris Counties. In a July 6, 1992 letter, for example, Fort Bend County referenced a meeting with Richard Long, then Manager of Addicks and Barker Reservoirs, at which “the issue of intermittent inundation or flooding within the Corps’ Barker Reservoir was discussed . . .” Letter from Ft. Bend County at HARVEY0000012. During the 1992 meeting, Mr. Long discussed “Noteworthy Pools” at the dams, including the fact that because the extent of government-owned land was lower than the maximum possible pool elevation, private properties in Fort Bend and Harris Counties could flood during high storm events. *Id.* The July 1992 letter confirms that the Corps released this information to the public twenty-five years before Hurricane Harvey hit the region.⁸

2. The October 1995 Reconnaissance Report

In October 1995, the Corps produced, and released for public review, a Reconnaissance Report to consider more fully the potential alternative measures identified in the 1992 Special Report. The Corps released this report to the public and transmitted notification of it to Congress. *See* 1995 Report at USACE015109.⁹

The 1995 Report informed the public of “a potential threat of property damage upstream of the reservoir lands. The dams and reservoir lands acquired for upstream temporary reservoir

⁸ Many of the residential subdivisions at issue in this case were approved by the Counties and constructed by developers after this date.

⁹ The Corps is authorized to prepare reconnaissance reports pursuant to Section 216 of the 1970 Flood Control Act, Pub. L. No. 91-611, 84 Stat. 1818. Section 216 authorizes preparation and publication of studies to “review the operations of completed Federal projects and to recommend and make project modifications or change operations, when advisable, because of significantly changed physical or economic conditions.” 1995 Report at USACE015132.

storage are now surrounded by residential and commercial urban developments.” *Id.* at USACE015136. The report recognized that then-recent storm “events indicate a potential for future flooding problems.” *Id.* at USACE015136-37 (estimating that the government-owned land could contain floods up to a frequency of once in 250 years and once in 70 years in Addicks and Barker Reservoirs, respectively).¹⁰

The possibility that an extreme storm could produce a large enough pool to impact private properties upstream of Addicks and Barker dams was well-understood by the mid-1990s. In its May 1996 Katy Freeway Corridor Flood Control Study, for example, the Harris County Flood Control District discussed, and depicted, a “‘fringe’ area upstream and adjacent to the reservoirs that was not purchased by the federal government but, could indeed flood given the height of the dams relative to these upstream areas.” 1996 Katy Freeway Corridor Flood Control Study at USACE686054. Due to unchecked growth, the “fringe” area encompassed an estimated 5,000 structures adjacent to Addicks Reservoir and 1,000 structures adjacent to Barker Reservoir, including the Test Properties involved in this case. *Id.* at USACE686055. The United States may call Steve Fitzgerald, HCFCD’s former Chief Engineer to discuss this report, as well as other HCFCD reports related to the dams.

Local media discussed HCFCD’s 1996 report, including a 2001 newspaper article: “As one example [of possible future flooding], a 1996 study showed that if the Addicks and Barker reservoirs ever filled to their spillways, more than 6,000 houses and other buildings would be

¹⁰ The 1995 Reconnaissance Report discussed several possible alternatives to address the potential for upstream flooding, but could find no economic justification for any of the proposals. *See id.* at USACE015138.

inside the reservoirs.” *Allison’s Victims, Six Months After the Storm*, Houston Chronicle, Dec. 23, 2001.¹¹

3. 2010-Era Public Meetings

Following a periodic dam safety inspection, in 2009, the Corps classified Addicks and Barker dams as Dam Safety Action Classification I (“DSAC I”), or “high hazard dams due to the probable loss of life and impacts on economic, environmental, and lifeline interests in the event of failure.” 2014 Emergency Action Plan at USACE019768.

In connection with the new DSAC rating, the Corps initiated a series of public presentations to remind the public about the possibility of upstream and downstream flooding. In August 2009, for example, Corps personnel held a public meeting to discuss the reservoirs. Among other things, the Corps informed participants of the extent of the government-owned land in both reservoirs and the maximum pools that could potentially form behind the dams.

In February 2010, the Corps conducted additional public information meetings in Houston and Katy, Texas. Two meetings focused on potential risks to upstream properties, and two other meetings focused on potential risks to downstream properties. The Corps provided public notice of the meetings by mailing postcards to more than 1,600 homes, publishing notices in newspapers, setting up road signs, sending formal letters of invitation, and issuing news releases. At the public meetings, the Corps discussed flood risks to upstream properties due to retention of floodwater and showed slides depicting upstream properties that would be impacted by pools of particular sizes.

¹¹ Dr. Bedient, Plaintiffs’ expert witness, is quoted in the same 2001 newspaper article: “The take-home message is Houston is very flood-prone, and we all need to learn to deal with the flood menace rather than think we can somehow fix it . . .” *Id.*

E. Hurricane Harvey

1. Hurricane Harvey Was an Extraordinarily Rare and Powerful Storm Event

Hurricane Harvey made landfall as a Category 4 hurricane on the Texas coast late on August 25, 2017, and then stalled near the Texas coast. Over the next four days, the storm dumped an estimated one trillion gallons of water in the greater Houston area. Harris County estimates that the storm produced enough rain to cover all of Harris County (approximately 1,800 square miles) with an average of more than 33 inches of water.¹²

Dr. Barry Keim, a Professor in the Department of Geography and Anthropology at Louisiana State University and Louisiana's State Climatologist, and Bill Kappel, President and Chief Meteorologist of Applied Weather Associates, assessed the rainfall associated with Hurricane Harvey. Andrew Earles, Ph.D., P.E., a Senior Principal with Wright Water Engineers, also analyzed the rainfall return periods and their impact on local drainage systems.¹³ These expert analyses show that Hurricane Harvey was an extraordinarily rare event. The average return period for the 120-hour rainfall event, for example, is 774 years and 846 years for the Addicks and Barker Watersheds, respectively. The storm impacted all 4.7 million people in Harris County. Emergency personnel and local civilians rescued more than 60,000 residents across all portions of Harris County. The Harris County Medical Examiner's Office confirmed thirty-six flood-related deaths across Harris County. Harris County estimated the storm flooded 154,170 homes in the county—an estimated nine to twelve percent of the total number of

¹² Between the mid-1940s and 2005, the average annual rainfall at Addicks and Barker Reservoirs was approximately 43 inches. Thus, in less than a calendar week, Hurricane Harvey brought approximately 80 percent of the normal average annual rainfall total to the region.

¹³ The United States may also call Jeff Lindner from Harris County Flood Control District to discuss Harris County's analysis of the storm and the resulting flooding in Harris County.

buildings. An estimated 300,000 vehicles were flooded. The vast majority of the damage, of course, had nothing to do with the pools associated with Addicks and Barker Reservoirs.

2. The Corps Reservoir Operations During Hurricane Harvey

The United States anticipates calling Robert Thomas to describe the government's actions during Hurricane Harvey and may call several other witnesses, including:

- Colonel Lars Zetterstrom, the District Commander of the Corps' Galveston District, who oversaw the Corps' activities related to the dams.
- Michael Kauffman, a Hydraulic Engineer and member of the Corps' Water Management Team, who monitored weather forecasts and led efforts to forecast pool levels behind the reservoirs.
- Jeffrey East, a Hydrologist with the United States Geological Survey ("USGS"), who coordinated and communicated with local, state, and federal agencies during the storm.

Those witnesses will explain that the Corps followed its water control manual, which governs operations of the two dams. The Corps works with the National Weather Service and the USGS to collect and disseminate pool elevation, and rainfall and runoff predictions, above and below the dams.¹⁴

If the pool elevations behind the reservoirs reach certain elevations and continue to rise at specified rates, the water control manual specifies the rate at which the Corps will release water. Such releases are intended to optimize use of available storage and ensure the future functionality of the reservoirs during rain events. Before Hurricane Harvey, pools at the reservoirs had never reached the trigger points specified in the water control manual.

The Corps had anticipated Hurricane Harvey could pose flooding issues for the Houston area and issued a Declaration of Emergency on August 22, 2017. During the storm, the Corps

¹⁴ The United States' Witness List will identify other individuals who may testify about forecasting and other activities during the storm, including additional employees of the Corps, USGS and the National Oceanic Atmospheric Administration.

made regular analyses of the predicted reservoir water levels to guide operational decision-making using the Corps' Water Management System model.

Impoundments exceeded government-owned land at Barker Reservoir upstream of the dam late August 27, and early August 28 at Addicks Reservoir. As the storm progressed, the pools behind the reservoirs continued to grow, eventually reaching a point where water began flowing around the north end of Addicks Reservoir. Such flows present significant concerns because they can degrade the spillway and result in a dam failure. The Corps initiated releases shortly after midnight on August 28 at both reservoirs.

Even with the releases, the pools behind the reservoirs continued to rise. Both reservoirs experienced record pools on the morning of August 30 of approximately 109.1 feet and 101.6 feet at Addicks and Barker Reservoirs, respectively. Rains stopped on August 30, although the watersheds above and below the dams continued to drain storm water after that date.

The Corps could not immediately reduce releases without stressing the outlet structures and potentially causing sloughing on the banks of the Buffalo Bayou.¹⁵ On September 3, the Corps approved and initiated a drawdown plan, which minimized damage to downstream properties while fulfilling the intent of the water control manual. Normal operations resumed on September 16, 2017.

F. Impact of Hurricane Harvey

The rainfall associated with Hurricane Harvey was unprecedented and overwhelmed the Corps' ability to confine floodwaters within government-owned land behind the dams. Although

¹⁵ The Corps had ample reason to worry about the stability of the outlet conduits. In 2015, the Corps began construction of a long-term fix by awarding a \$72 million contract to overhaul the reservoirs' outlet structures. When Hurricane Harvey hit, the conduit structures were active work areas. The Corps anticipates construction of the new outlet works will be completed in 2021.

the Project significantly reduced downstream flooding, it could not protect the City of Houston fully. Properties above the dams, below the dams, and in areas of the city far from the dams flooded. Hundreds of property owners below the dams, whose properties allegedly flooded during the storm, argue that the United States effected a taking of their properties as a result of the releases from the dams. *See* No. 17-9002, ECF No. 23 (Master Compl.). Dr. Robert Nairn, a Principal and Engineer with Baird & Associates and a recognized river and coastal engineering expert, analyzed the flooding on the upstream and downstream Test Properties. He will explain that if the Corps had kept the dam gates closed during the storm, as it would have had to do to reduce downstream flooding, the upstream Test Properties would have flooded far more and far longer than they actually flooded.

Dr. Nairn also evaluated what would have happened if the Corps had kept the gates open during the entire storm. He will explain that in that scenario, at least five of the thirteen upstream Test Properties (Burnham, Sidhu, Turney, Micu, and Giron) would have flooded to various depths. In addition, Dr. Nairn evaluated what would have happened if the Corps had never built the Project. He will explain that in that scenario, three of the thirteen upstream Test Properties (Burnham, Micu and Giron) would have flooded to various depths.¹⁶

J.P. Du Plessis, a Senior Cost Estimator, together with David Hooper, a Microbiologist and Restoration Consultant, determined that the types of repairs required under the hypothetical conditions analyzed by Dr. Nairn were materially similar to the repairs that were actually required.

¹⁶ Dr. Nairn's analyses referenced surveyed elevations of the Test Properties taken by Billy Wolfram, a Project Manager at Landtech, Inc., and a Registered Professional Land Surveyor. The United States may call Mr. Wolfram to discuss those elevation data.

The historically-large Hurricane Harvey event had a widespread impact on thousands of properties in the Houston area. The storm resulted in significant losses, estimated at over \$125 billion. Some small part of that damage occurred on homes upstream of the dams and some smaller part still occurred on twelve of the thirteen upstream Test Properties (the interiors of the Popovici property and one of the Sidhu properties did not flood at all).¹⁷ Although twelve of the Test Properties experienced damages as a consequence of floodwaters, all Plaintiffs have repaired, or could repair, their properties to their pre-Hurricane Harvey conditions. Dr. Craig Landry, a Professor of Agricultural and Applied Economics at the University of Georgia, investigated the possibility of a long-term economic stigma associated with upstream flooding adjacent to the reservoirs. His expert analyses show that the market area surrounding the Upstream Test Properties have recovered much, if not all, of their pre-Hurricane Harvey values. The data suggest that properties are being repaired and that the storm's effects on market value are short-term, are relatively small, and are lessening over time.

After the storm, the United States provided billions of dollars of assistance to help individuals and families, including:

- \$2.9 billion, for more than 47,000 flood insurance claims; and
- \$4.8 billion, in individual assistance for more than 177,000 impacted individuals.

2018 HCFCD Final Report at GALLOWAY_000766. The United States may call employees of FEMA to discuss these programs. In addition, the Department of Housing and Urban Development allocated \$57.8 billion of Community Development Block Grant disaster recovery funds to the State of Texas in response to Hurricane Harvey. Additional grants have been made

¹⁷ The Sidhu Test Property consists of two apartments—one on the ground floor and one on the second floor. The apartment on the second floor did not flood during the storm.

since that initial allocation, and some of those funds will be available for distribution to eligible homeowners to assist with their recovery efforts.

II. Procedural Background

The Court docketed the first Hurricane Harvey-related lawsuit on September 5, 2017. *Y & J Props., Ltd. v. United States*, No. 17-1189 (filed Sept. 5, 2017). Hundreds of additional complaints followed. After first assigning herself to a global master docket, on December 8, 2017, then-Chief Judge Braden split the claims into upstream and downstream subdockets. *See* ECF No. 102 in Master Docket No. 17-3000L. On December 8, 2017, the United States moved for a more definite statement. ECF No. 3. The Court denied that motion on February 1, 2018. ECF No. 36.

On February 1, 2018, the Court “reaffirmed” its prior scheduling order, which contemplated a truncated period of fact discovery, to end on May 31, 2018. ECF No. 69. That order confirmed a November 20, 2017 Scheduling Order issued in the Master Docket, which had established a three-month discovery period between the date of the filing of the United States’ answer and the close of fact and expert discovery. *See* ECF No. 70 in Master Docket No. 17-3000L. The United States opposed that schedule on the grounds that it afforded far too little time to develop fully the necessary facts and expert analyses. *See, e.g.*, ECF No. 20 in Master Docket No. 17-3000L.

On March 13, 2018, the Court identified fourteen Test Properties, some over the United States’ objection. ECF No. 91. On September 27, 2018, the Court allowed Plaintiff Mario Mitchell to dismiss his claim without prejudice, again over the United States’ objection. ECF No. 148.

The United States filed a Motion to Dismiss on February 16, 2018. ECF No. 59. On May 24, 2018, citing RCFC 12(i), the Court deferred resolution of the United States' motion to dismiss. ECF No. 120.

The Court's February 1, 2018 Scheduling Order required, among other things, that the parties file any post-discovery "Dispositive Motions" by June 15, 2018. On May 14, 2018, the United States filed a motion to modify that order by extending fact and expert discovery. ECF No. 115. On May 25, 2018, the Court rejected that proposal, and maintained an expedited fact and expert discovery schedule, without providing an opportunity for post-discovery motion practice. ECF No. 122. The Court's May 25 Scheduling Order also set trial to commence in February 2019. The United States opposed that schedule because it lacked sufficient time to complete fact discovery, investigate all issues, and prepare necessary expert analyses.

In order to address the prejudice to the United States arising from the expedited scheduling orders in the two subdockets, on October 25, 2018, the United States filed a Motion to Consolidate. ECF No. 167. The Court denied that motion on November 21, 2018, ECF No. 177, and the Court subsequently denied a similar motion the United States had filed in the downstream subdocket. No. 17-9002L, ECF No. 148.

The expedited schedule significantly prejudiced the United States ability to prepare this case for trial. With adequate time to prepare, the United States could have raised additional defenses and prepared additional and more fulsome expert analyses. The expedited schedule adopted in this case significantly prejudices the United States. Indeed, in the downstream subdocket, the Court recently found "the previously set pretrial and trial schedule to be infeasible and inoperable," and, for that reason, vacated the marginally *less accelerated* schedule in that

subdocket. No. 17-9002L, ECF No. 158 (noting plaintiffs' acknowledgment that the pace of litigation was "unprecedented").

III. Legal Arguments

"[N]o magic formula enables a court to judge, in every case, whether a given government interference with property is a taking" because of "the nearly infinite variety of ways in which government actions or regulations can affect property interests[.]" *Ark. Game & Fish Comm'n v. United States*, 568 U.S. 23, 31 (2012). And although "government-induced flooding temporary in duration gains no automatic exemption from Takings Clause inspection," a taking caused by temporary flooding is the exception, and not the rule. *See id.* at 37-38 (explaining that the "modest" decision "augurs no deluge of takings liability"). The Court should reject Plaintiffs' claims for a number of independent reasons.

A. Plaintiffs' Claims Fail Because a One-Time, Temporary Flooding Event Resulting from a Hurricane Can Never Establish a Taking, Rather than a Tort

When a plaintiff alleges a Fifth Amendment taking of real property, as opposed to a tort, the Court must determine first, "whether the effects [plaintiff] experienced were the predictable result of the government's action, and second, whether the government's actions were sufficiently substantial to justify a takings remedy." *Ridge Line, Inc. v. United States*, 346 F.3d 1346, 1355 (Fed. Cir. 2003). Plaintiffs' pre-trial brief inappropriately conflates the government actions of building, modifying and operating the Addicks and Barker dams during a 70-year period. *See Acceptance Ins. Cos. v. United States*, 583 F.3d 849, 855 (Fed. Cir. 2009). Plaintiffs cannot, in any event, meet their burden.

First, Plaintiffs must show that the pertinent government action was intended to invade private property or that such an invasion should be deemed intended because it was "the 'direct,

natural, or probable result of an authorized activity and not the incidental or consequential injury inflicted by the action.”” *Ridge Line*, 346 F.3d at 1355 (quoting *Columbia Basin Orchard v. United States*, 132 F. Supp. 707, 709 (Ct. Cl. 1955)). Plaintiffs cannot meet this burden. The flooding on the Test Properties occurred as a direct result of the largest rainfall event in the history of the United States, and would not have occurred but for the unprecedented, naturally-occurring Hurricane Harvey. The damage to the Test Properties were incidental injuries, which do not constitute a compensable taking under the Fifth Amendment.

Second, Plaintiffs must show that the “government’s interference with any property rights of [plaintiff] was substantial and frequent enough to rise to the level of a taking.” *Ridge Line*, 346 F.3d at 1357. “Isolated invasions, such as one or two floodings . . . do not make a taking . . . , but repeated invasions of the same type have often been held to result in an involuntary servitude.”” *Id.* at 1355 (quoting *Eyherabide v. United States*, 345 F.2d 565, 569 (Ct. Cl. 1965); *Ark. Game & Fish Comm’n*, 568 U.S. at 29 (“[W]hile a single act may not be enough, a continuance of them in sufficient number and for a sufficient time may prove [a taking].” (quoting *Portsmouth Harbor Land & Hotel Co. v. United States*, 260 U.S. 327, 329-30 (1922))); *Fromme v. United States*, 412 F.2d 1192, 1197 (Ct. Cl. 1969) (per curiam) (no taking where flooding of land could “reasonably be expected to recur . . . once in every 15 years, on the average”); *N. Crys. Hydro-Elec. Co. v. United States*, 151 F. Supp. 322, 323 (Ct. Cl. 1957) (“Two floodings, one ten years after the pool behind the dam was completely full, and the other nineteen years after, do not constitute a taking.” (citations omitted)); *B. Amusement Co. v. United States*, 180 F. Supp. 386, 389 (Ct. Cl. 1960) (one flood not sufficient to constitute a taking); *Nat’l By-Products, Inc. v. United States*, 405 F.2d 1256, 1273-75 (Ct. Cl. 1969) (two floods not sufficient to constitute a taking)). Hurricane Harvey caused the reservoirs to rise to record pool

elevations and, for the first time, some property owners experienced flooding inside their homes. Plaintiffs' claims fail because one-in-a-lifetime flooding of the Test Properties associated with a single, extraordinarily-large storm, unprecedented in both the historical record and the Project's 70-year history, does not constitute a compensable taking under the Fifth Amendment.

Moreover, for the government's actions to constitute a taking, "an invasion must appropriate a benefit to the government at the expense of the property owner, or at least preempt the owner's right to enjoy his property for an extended period of time, rather than merely inflict an injury that reduces its value." *Ridge Line*, 346 F.3d at 1356 (citations omitted). But here, the alleged invasion did neither. The United States gained no benefit from the flooding that occurred. And the flooding did not preempt Plaintiffs' right to enjoy their properties for an extended period of time. Flooding was instead the unfortunate and inevitable consequence of an unprecedented natural event. The widespread effects of Hurricane Harvey damaged twelve of Plaintiffs' homes (and thousands of other homes in the Houston area), caused Plaintiffs to vacate their properties for a short period of time and, for some, resulted in expenditure of money on repairs.¹⁸ But the "mere[] inflict[ion of] an injury that reduces [a property's] value" does not establish a Fifth Amendment taking. *Id.*

B. Plaintiffs' Claims Fail Because the Corps' Actions Were an Exercise of Governmental Power to Prevent Loss of Life and Mitigate Inevitable Damages to Private Properties

The Supreme Court has long held that all property rights are subject to a "fair exercise" of the police power. *Chi. & Alton R.R. Co. v. Tranbarger*, 238 U.S. 67, 77 (1915). Even the destruction or seizure of property is not generally viewed as a compensable taking so long as the

¹⁸ The interior of the Popovici property and one of the condominium units owned by Plaintiff Sidhu did not flood at all. The Court should dismiss those claims for that reason alone.

government is acting to protect public health or safety. *See, e.g., Mugler v. Kansas*, 123 U.S. 623 (1887). Particularly in an emergency, where the government action is part of an effort to reduce or mitigate inevitable harms to the public, no viable taking claim exists. *See Miller v. Schoene*, 276 U.S. 272, 279-80 (1928) (state-ordered destruction of cedar trees to prevent spread of disease to nearby apple trees held not be a taking); *Bowditch v. City of Boston*, 101 U.S. 16, 18-19 (1879) (government not liable for a taking where firefighters destroyed a home to arrest the spread of fire in the protection of other private properties). That principle applies here and precludes recovery.¹⁹

Plaintiffs cannot dispute that the Corps acted in an emergency or was endeavoring to protect lives and private property. Indeed, Plaintiffs assert that the government operation of the dams flooded their upstream properties in order “to protect downtown Houston, the Houston Ship Channel, and those other properties downstream of the dams from catastrophic flooding.” Pls.’ Pretrial Br. at 3. But, to maximize protection of the downstream properties, the Corps would have had to have kept the gates on both dams closed throughout Hurricane Harvey. The United States’ hydrologic expert, Dr. Robert Nairn, will testify that, with the gates closed, all of the upstream Test Properties would have flooded to a greater extent than they actually did during the storm.

Plaintiffs ignore that naturally-occurring floodwaters overwhelmed the capacities of the Project and suggest incorrectly that the Corps could have prevented flooding of the upstream Test Properties. The unprecedented duration and volume of rainfall from Hurricane Harvey was

¹⁹ The police powers argument is also set forth in the United States’ Motion to Dismiss (ECF No. 59). Although the Court rejected this argument as a basis for dismissal of Plaintiffs’ complaint, *see* 138 Fed. Cl. 658, 669 (2018), this argument should be reassessed based on the full record to be presented at trial.

too great to allow the Corps to operate the Project in a manner that would have confined all floodwaters to government-owned land. Dr. Nairn will testify that even if the Corps had left all of the gates open during the Harvey event, at least five of the Test Properties (Burnham, Sidhu, Turney, Micu and Giron) would have experienced flooding.

Although the Corps could not prevent flooding of all private property, the Corps' operation of the Project protected the integrity of the dams and avoided the risk of far more significant loss of life and property damage downstream of the dams. Those operations, in the midst of an emergency caused by a particularly-strong hurricane, were an exercise of the government's police powers and cannot support a claim for compensation under the Fifth Amendment.

C. Plaintiffs' Claims Fail Because the Claimed Losses Were Not the Direct, Natural or Probable Result at the Time the Corps Constructed the Project

The Court can hold the United States liable only if Plaintiffs prove, *inter alia*, that their claimed damages are "directly attributable to government action," not when the government action is a secondary or contributory factor. *Bartz v. United States*, 633 F.2d 571, 593 (Ct. Cl. 1980) (per curiam). Thus, a claimant in a Fifth Amendment case bears the burden of showing that his injury is the "direct, natural, or probable result of an authorized activity and not the incidental or consequential injury inflicted by the action." *Ridge Line*, 346 F.3d at 1355 (quoting *Columbia Basin Orchard*, 132 F. Supp. at 709); *Big Oak Farms, Inc. v. United States*, 105 Fed. Cl. 48, 58 (2012) (sand and gravel deposits that filled and impaired drainage ditches after flood constituted consequential damages only). The focus should be at the time the government acted—here, when the Corps constructed the dams in the 1940s. *See John Horstmann Co. v. United States*, 257 U.S. 138, 146 (1921); *Ark. Game & Fish Comm'n v. United States*, 736 F.3d 1364, 1373 (Fed. Cir. 2013).

In evaluating this factor, the Court must consider “the degree to which the invasion is intended or is the foreseeable result of authorized government action.” *Ark. Game & Fish Comm’n*, 568 U.S. at 39. Making the showing requires more than simply showing some remote possibility of the complained of injury. The agency’s knowledge at the time of action that a particular result is a *possible* result does not mean it is a *direct, natural or probable* result; therefore, an agency’s recognition of the possibility of a result from an action does not meet this element. *Moden v. United States*, 404 F.3d 1335, 1345 (Fed. Cir. 2005). Even an intentional act that increases the risk of a detrimental result “does not equate to making the detrimental result direct, natural, or probable.” *Cary v. United States*, 552 F.3d 1373, 1378 (Fed. Cir. 2009).

In the 1940s, the Corps determined the pool that would result from the 1935 Storm, the most intense storm to visit the basin during the period of record. The Corps acquired an additional three vertical feet above that pool to ensure it had a large enough area to impound water and mitigate flood damage even in a significantly larger storm than what had previously been observed in the area. Although the Corps engineered the dams not to fail during a much larger storm (the 1899 Hearne storm), the probability of that storm occurring was extraordinarily low. The Corps’ predictions from the 1940s were borne out over the first 70 years of the Project’s existence, as the dams contained floodwaters within the government-owned land. The upstream flooding that occurred in 2017 as a result of a historically-large storm was not the direct, natural or probable result of the Corps’ construction of the dams more than 70 years earlier.

Further, the majority of upstream development occurred decades after the Corps constructed the dams. In the 1940s, upstream properties consisted of rice farms and ranches. The Corps could not have expected in the 1940s that these properties would develop into

residential subdivisions or that flooding, more than half a century later in 2017, might impact those recently-developed homes and businesses. The damage to Plaintiffs' properties that occurred during Hurricane Harvey was not the direct, natural or probable result of constructing a flood control project in sparsely populated ranchland more than seventy years earlier.

In addition, Hurricane Harvey did not result from any Corps' action and a rainfall event of the magnitude of that storm was not the direct, natural or probable result at the time the Corps constructed the Project. Hurricane Harvey was an unprecedented storm in the historical record, not a probable event in this watershed in the 1940s. Dr. Keim will testify that no other storm at any location in North America has ever produced as much rainfall as Hurricane Harvey from a total volume perspective and for durations from three to five days. The National Weather Service concluded that the storm was a 1,000-year event. HCFCD determined that the storm's maximum rainfall in Harris County over a four-day period had a return interval exceeding 5,000 years in most areas.²⁰

Looking solely at the resulting rainfall over the Addicks and Barker watersheds, Hurricane Harvey is still an exceedingly rare storm in terms of rainfall depth and duration. For the Addicks watershed, Dr. Keim will testify that the average rainfall from Hurricane Harvey for the 120-hour duration exceeded 30 inches, and that the average return interval for that rainfall event is 774 years. For the Barker watershed, Dr. Keim will testify that that the average rainfall from Hurricane Harvey for the 120-hour duration exceeded 30 inches, and that the average return interval for that rainfall event is 846 years.

²⁰ Dr. Keim will testify that the storm producing the largest volume of rainfall over the Houston region prior to Hurricane Harvey was Tropical Storm Allison in June 2001, and that Harvey's rainfall is 21.7 percent larger than the rainfall from Allison at 120 hours over 100,000 square miles.

Under any of these metrics, Hurricane Harvey was a record rainfall event that far exceeded the rainfall associated with the 1935 storm. Hurricane Harvey’s extraordinary rainfall resulted in widespread flooding throughout Harris and Fort Bend Counties. A storm of this magnitude and the resulting flooding on private properties were considered, at most, extremely remote possibilities when the Project was designed and constructed. Such a concentrated volume of rainfall had never occurred anywhere in the United States before project construction and has not occurred since. The historic rainfall and flooding associated with Hurricane Harvey were not the direct, natural or probable result of the Project’s construction. Accordingly, Plaintiffs’ claims cannot succeed.

D. Plaintiffs’ Claims Fail Because they Lack a Compensable Property Interest to be Free of Floodwaters Generated During a Hurricane

Plaintiffs’ claims fail, too, because Plaintiffs lack a compensable property right to be free of flooding during a hurricane. Only those expectancies that are “fortified by law” are compensable property rights. *Broughton Lumber Co. v. United States*, 30 Fed. Cl. 239, 243 (1994) (citing *United States v. Willow River Co.*, 324 U.S. 499, 502 (1945)). *See also Webb’s Fabulous Pharms., Inc. v. Beckwith*, 449 U.S. 155, 161 (1980) (“[A] mere unilateral expectation or an abstract need is not a property interest entitled to protection.”). Under Texas law, Plaintiffs have no right to keep floodwaters from their properties, and no guarantee to the free use and enjoyment of their property during and after a hurricane, a tropical storm or any other “Act of God” that results in flooding. *See, e.g., Benavides v. Gonzalez*, 396 S.W.2d 512, 514 (Tex. App. 1965) (finding that “[u]nprecedented rainfall or Act of God is uniformly recognized” as a defense for allegedly unlawful diversions of water (citation omitted)); *Ford Motor Co. v. Dallas Power & Light Co.*, 499 F.2d 400, 413 (5th Cir. 1974) (noting that a reservoir operator “did not create the flood” that caused the damage); *Sabine River Auth. of Texas v. Hughes*, 92 S.W.3d

640, 642 (Tex. App. 2002) (finding no intentional act of the government in its operation of a reservoir during extreme precipitation); *Wickham v. San Jacinto River Auth.*, 979 S.W.2d 876, 881, 883 (Tex. App. 1998) (flooding claims based on a rainfall event exceeding the 100-year frequency rejected at summary judgment (citing *DuPuy v. City of Waco*, 396 S.W.2d 103, 108-09 (Tex. 1965))).

The Test Properties were developed decades after the construction of the Project, when the land was already subject to the remote possibility of inundation from dam operations. Plaintiffs purchased their properties years after that. Under Texas law, a landowner possesses no right to be free from invasions from the operation of projects whose construction and operations pre-dated the acquisition of their properties. *See Thomas v. Bunch*, 41 S.W.2d 359, 362-63 (Tex. App. 1931) (holding that a landowner erecting a dam to protect land acquired a vested right to maintain dam as originally constructed), *aff'd*, 49 S.W.2d 421 (Tex. 1932); *see also City of Dallas v. Winans*, 262 S.W.2d 256, 258 (Tex. App. 1953) (finding no liability where municipality's operation had not changed, and noting that "if a cause of action ever existed, it was in favor of some remote predecessor in title, not appellee"); *Meuth v. City of Seguin*, No. 04-16-00183-CV, 2017 WL 603646, at *3 (Tex. App. Feb. 15, 2017) (finding no liability where municipality continued to operate drainage culvert that was built prior to plaintiff's acquisition of property). Plaintiffs' property rights are further shaped by background principles of federal law established in the Flood Control Act of 1928.

The risk of flooding is a risk shared by all property owners in the greater Houston area. Federal, state, and local governments have recognized this risk and expended significant public funds on flood risk management projects throughout the region. But these projects do not eliminate the risk of flooding. No landowner in a flood-prone region has a legitimate

expectation, much less a protected property right, to be free of floodwaters during a hurricane or storm event producing rainfall that results in widespread flooding. Moreover, this is not a situation where the United States could have prevented all flooding of upstream (or downstream) properties during Harvey. The United States' hydrologic expert, Dr. Robert Nairn, will testify that floodwater inflow rates to the reservoirs (that is, flows generated from rainfall and runoff completely unrelated to any action by the Corps) reached at least 160,000 cubic feet per second during the Harvey event, but the maximum combined capacity of the release conduits on the Addicks and Barker dams is only approximately 16,000 cubic feet per second. At least three Test Properties would have flooded even without the Project and at least five properties would have flooded if the Corps had kept the gates to the dams open during Hurricane Harvey. Plaintiffs lacked a property right under Texas law to be free of floodwaters during Hurricane Harvey and their claims, therefore, must fail.

E. Plaintiffs' Claims Fail With Respect to the Test Properties that Would Have Flooded Even in the Absence of Government Action

“It is well established that a takings plaintiff bears the burden of proof to establish that government action caused the injury.” *St. Bernard Parish Gov’t v. United States*, 887 F.3d 1354, 1362 (Fed. Cir. 2018), *cert. denied*, No. 18-359, 2019 WL 113112 (S. Ct. Jan. 7, 2019). “Causation requires a showing of ‘what would have occurred’ if the government had not acted.” *Id.* (quoting *United States v. Archer*, 241 U.S. 119, 132 (1916)). Plaintiffs, therefore, must prove that the damage to their properties would not have occurred in the absence of the government’s action.

Dr. Nairn conducted the only computer modeling for purposes of this case. His investigations prove that at least five upstream Test Properties (Burnham, Sidhu, Turney, Micu, and Giron) would have flooded to various depths if the Corps had not closed the dam gates

during Hurricane Harvey. Dr. Nairn will also show that at least three Test Properties (Burnham, Micu, and Giron) would have flooded to various depths even if the Corps had never built the Project.

Although the depths and durations of flooding in those scenarios were less than the flooding that actually occurred, that flooding would have resulted in comparable damage to those three properties. Messrs. Du Plessis and Hooper conducted the only expert analyses of the extent of damage in those scenarios. They will explain that the type and extent of repairs in those scenarios are materially similar to the repairs that were actually required. Thus, the construction and operation of the Project did not effect a taking of those properties. To hold otherwise “would be to say that the Fifth Amendment requires the Government to pay a landowner for damages which may result from conjectural major floods, even though the same floods and the same damages would occur had the Government undertaken no work of any kind.” *United States v. Sponenbarger*, 308 U.S. 256, 265 (1939). The Supreme Court has been clear that such a holding “would far exceed even the ‘extremest’ conception of a ‘taking’ by flooding within the meaning of that Amendment.” *Id.* (internal quotations in original, citations omitted).

F. Plaintiffs’ Claims Fail Under the Multi-Factor Test Established in *Arkansas Game and Fish Commission*

The Supreme Court has held that “not every act of government-induced flooding constitutes a taking.” *Ark. Game & Fish Comm’n*, 736 F.3d at 1370; *see also Ridge Line*, 346 F.3d at 1355 (not every “invasion” of private property resulting from government activity amounts to an appropriation). Although “government-induced flooding of limited duration may be compensable,” in some circumstances, the Court must “weigh carefully the relevant factors and circumstances in each case. *Ark. Game & Fish Comm’n*, 568 U.S. at 34, 36. “Flooding

cases, like other takings cases, should be assessed with reference to the particular circumstances of each case” *Id.* at 37 (internal quotations and citations omitted).

1. The Character of Plaintiffs’ Land—Plaintiffs’ Properties Are Located Within an Area Subject to Controlled Inundation, With a Propensity to Flood

The “character of the land at issue” is relevant to the takings inquiry. *Id.* at 39. The history and characteristics of the subject properties should include consideration of the location of the properties relative to floodplains and floodways, whether the properties have always been at risk of flooding, and the nature and extent of previous flooding on the property.

Sponenbarger, 308 U.S. at 265.

Plaintiffs’ expert, Dr. Bedient, will confirm at trial that Houston is the most flood-prone city in the United States. The history of flooding in this area is well-documented and undisputed. HCFCD informs residents on its website that flooding is Harris County’s natural disaster, and that a major flood occurs somewhere in the County about every two years.²¹ Because of the risk of flooding, Harris County recommends that everyone in the County obtain flood insurance under the National Flood Insurance Program.²²

The Test Properties, in particular, have long been subject to the risk of flooding, including possible inundation associated with the pools impounded by the Project. The Corps completed the Project approximately 70 years ago. All of the Test Plaintiffs acquired their properties decades after construction. Since the date of Plaintiffs’ acquisition, the character of

²¹ See <https://www.hcfcd.org/flooding-floodplains/harris-countys-flooding-history/> (last visited Jan. 30, 2019).

²² See <https://www.hcfcd.org/flooding-floodplains/flood-insurance-who-needs-it/> (last visited Jan. 30, 2019).

Plaintiffs' properties, therefore, has been flood-prone properties, as a result of nature itself, and as a result of their proximity to the Project.

Prior to the development of these properties, USGS Topographical Maps of the area upstream of Addicks and Barker Reservoirs identified both reservoirs, and the lands where the Test Properties are located, as "subject to controlled inundation." USGS Topographic Map at USGS0073379. Developers built the residential subdivisions in which Test Properties are located, and the Counties approved those developments, decades after the Corps constructed the dams, with full knowledge of this risk of inundation.

The flood-prone character of the Test Properties is reflected by the fact that, when Hurricane Harvey struck, nearly all of the Test Properties were located within, or close to, floodplains expected to flood during significant storm events:²³

- Burnham—within 100-year floodplain;
- Giron, Bunker, Wind, Turney, Micu—within 500-year floodplain;
- Holland, Stewart, Sidhu, Popovici, Soares—close to 100-year floodplain;
- West Houston Airport, Lakes on Eldridge—close to 500-year floodplain.

Given the properties' natural tendency to flood, some properties have flooded (including Burnham and Turney), or nearly flooded (including Stewart, Lakes on Eldridge, Giron, Turney, Sidhu, Popovici, and Holland), in earlier storms for reasons unrelated to the Project. The fact that the Test Properties flooded during Hurricane Harvey, greater than a 750-year storm in the relevant watershed, should surprise no one, given the character of these properties.

²³ The 100-year and 500-year floodplains are depicted on FEMA's Flood Insurance Rate Maps ("FIRMs"). Lands located within the 100-year floodplain are in the Special Flood Hazard Area and have a one percent chance of flooding in a given year; lands within the 500-year floodplain have a 0.2 percent chance of flooding in a given year.

The Test Properties have always been subject to flood risk and the flooding that occurred during Hurricane Harvey did not change that characteristic. This factor, therefore, weighs against finding a compensable taking.

2. Severity—The Repairable Damage to the Test Properties is Not the Type of Severe Impact that May Support a Fifth Amendment Claim

“Severity of the interference figures in the [liability] calculus as well.” *Ark. Game & Fish Comm’n*, 568 U.S. at 39 (citations omitted). This factor favors a finding of no liability because repairable damage resulting from temporary flooding during a single flood event is not the type of severe impact that can support a claim for compensation under the Fifth Amendment.

According to Plaintiffs’ expert, Dr. Bedient, six Test Properties experienced less than a foot of water inside the structures (Giron, Soares, WHA, Stewart, Wind, and Lakes on Eldridge). Six properties (Micu, Banker, Holland, Sidhu, Turney, and Burnham) experienced higher flooding, but all of the properties were repairable once the water receded. The interior of the Popovici property and one of the Sidhu units did not flood and required no repairs. When the water receded, the structures retained their pre-Hurricane Harvey character, and Plaintiffs can use their properties for the same pre-storm purposes.

Dr. Nairn will show that the interiors of at least five of the Test Properties—Burnham, the ground level Sidhu unit, Turney, Micu, and Giron—would have experienced some flooding if the Corps had kept the gates open during the entire Hurricane Harvey event. Dr. Nairn will also show that the interiors of three of the thirteen Test Properties—Burnham, Micu, and Giron—would have experienced some flooding even if the Corps had never built the dams. Although these properties would have flooded less than they actually did, the required repairs still would have been significant. The incremental damages between what these Test Properties experienced

as compared to what they would have experienced in the absence of a government action are not sufficiently severe to rise to a compensable taking.

At least three Test Plaintiffs had flood insurance when Hurricane Harvey struck (Wind, LOE, and Popovici) and at least nine Test Plaintiffs received FEMA grants (Burnham, Stewart, Turney, Wind, Holland, Bunker, Giron, Soares, and Micu), which may have offset their out-of-pocket repair expenses. Many landowners, including the Test Plaintiffs, may benefit from additional federal grant monies that will soon become available.

This type of repairable, temporary harm from water damage in a flood-prone area is manifestly different from the type of injury that can support a Fifth Amendment claim. In *Arkansas Game and Fish Commission*, for example, the plaintiff argued that the “cumulative impact of this flooding over a six-year period . . . resulted in the destruction of timber in the Management Area and a substantial change in the character of the terrain, which necessitated costly reclamation measures.” 568 U.S. at 29 (emphasis added). The flooding allegedly “altered the character of the Management Area,” rendering “natural regeneration of the forests improbable in the absence of reclamation efforts.” *Id.* at 30. Plaintiffs’ properties here suffered no such permanent injury or modification of the character of their land and this factor, therefore, weighs against a finding of a compensable taking.

3. Reasonable Investment-Backed Expectations—Plaintiffs Lacked a Reasonable Investment-Backed Expectation that their Properties Would Never Flood

A landowner’s ““reasonable investment-backed expectations’ regarding the land’s use” is a relevant factor. *Id.* at 39 (citation omitted). An objective standard applies. *See Chancellor Manor v. United States*, 331 F.3d 891, 907 (Fed. Cir. 2003). The “burden is on the owners to establish a reasonable investment-backed expectation in the property at the time it made the

investment.” *Cienega Gardens v. United States*, 503 F.3d 1266, 1288 (Fed. Cir. 2007) (citing *Forest Props., Inc. v. United States*, 177 F.3d 1360, 1367 (Fed. Cir. 1999)). Plaintiffs cannot meet their burden because they had no objectively reasonable expectation that their properties would not flood in a Hurricane Harvey-like event, nor can they show that the Corps’ operations during Hurricane Harvey frustrated a reasonably-held expectation that they had when they purchased the Test Properties.

One Test Property (Burnham) is located within the 100-year floodplain and four others are located within the 500-year floodplain. Those properties should expect to flood during a storm the size of Hurricane Harvey (over a 700-year storm in these watersheds). The other properties are near the 100-year and 500-year floodplains and should, therefore, also expect to flood in larger storm events, like Hurricane Harvey. The deeds for the three Test Properties located in Ft. Bend County (Giron, Bunker, and Micu) and one in Harris County (Soares) expressly incorporate subdivision plats into the property description and include warnings, such as: “This subdivision is located adjacent to Barker Reservoir and is subject to extended controlled inundation under the management of the U.S. Army Corps of Engineers.”²⁴ Fort Bend Drainage District directed that this language be included to inform potential property owners of flooding risks. Nine Test Plaintiffs (Bunker, Burnham, Giron, Holland, LOE, Micu, Popovici, Sidhu, and Soares) acquired their properties after 1992, when the evidence shows the Corps openly discussed the possibility of upstream flooding with the public and local governments, and

²⁴ The subdivision plat for the Micu property states: “This subdivision is adjacent to the Barker Reservoir and for events greater than the 100-year flood event, could be subject to extended controlled inundation under the management of the U.S. Army Corps of Engineers.” Plat Map for Canyon Gate Cinco Ranch at FB0025541.

two Test Plaintiffs (Burnham, and Micu) acquired their properties years after 2010, when the Corps held public meetings to discuss that possibility.

Dr. Galloway conducted the only expert investigation related to this factor. He examined multiple characteristics for each Test Property, and concluded that “at the time of their acquisition of the test properties, sufficient indicators were available to Plaintiffs to determine that the properties would be prone to flood in a Hurricane Harvey-like event.” Galloway Expert Report at 92. This factor, too, favors a finding of no liability.

4. Duration—A One Time Flooding Event During a Historically-Large Storm Cannot Support a Fifth Amendment Claim

The shorter the period of alleged invasion, the less likely a taking exists. *See Ark. Game & Fish Comm'n*, 568 U.S. at 38 (“When regulation or temporary physical invasion by government interferes with private property, our decisions recognize, time is indeed a factor in determining the existence *vel non* of a compensable taking.” (citations omitted)).

Plaintiffs base their claim on one flood event, which occurred during a single, historically-large storm. The interiors of the Test Properties flooded for as little as 22 hours (Wind), to as long as approximately a week (Turney). At least three properties would have flooded in the absence of the Project, and at least five properties would have flooded if the Corps had left the gates open during the entire storm. Those scenarios provide the proper points of comparison and reduce the relevant duration of flooding.

In addition, the resultant damage is repairable, meaning that the flooding did not alter the Test Properties’ pre-flooding, “intended purposes.” *Ark. Game & Fish Comm'n*, 736 F.3d at 1370. The durations of inundation at issue in this case (particularly compared to the entire

period of ownership) are extraordinarily short and do not support a finding of a compensable taking.²⁵

G. Plaintiffs Cannot Establish a Taking of Personal Property

Plaintiffs' principal claims are that the design, construction and operation of the Addicks and Barker Dams effected a taking of real property. Plaintiffs also claim that the United States effected a taking of personal property. In contrast to their real property claims, Plaintiffs do not contend that their personal property was used for a public purpose. Plaintiffs instead claim that unidentified personal property was damaged or destroyed by floodwaters, which they incorrectly treat as sufficient to establish a taking.

Plaintiffs' claims regarding personal property are independent of their real property claims and must be separately proven. Plaintiffs' pretrial brief offers insufficient grounds to analyze such claims, much less for the Court to conclude that the design, construction and operation of the dams effected a taking of personal property. The Court should, therefore, reject those claims.

IV. Conclusion

The United States acknowledges the difficulties Houston residents faced during and after this extreme storm event. Many continue to struggle and the United States has expended

²⁵ The duration of flooding here is far less than the duration at issue in other flooding cases. On remand in *Arkansas Game and Fish*, for example, the Federal Circuit found the “period of flooding imposed a severe burden on [plaintiff’s] property” because the repeated incidents of flooding over a six-year period so profoundly changed the property that plaintiff “could no longer use those regions for their intended purposes, *i.e.*, providing habitat for wildlife and timber for harvest.” *Ark. Game & Fish Comm’n*, 736 F.3d at 1370 (internal quotation marks and citation omitted). *See also Laughlin v. United States*, 22 Cl. Ct. 85, 111 (1990) (flooding deprived plaintiff of property for a five-year period), *aff’d*, 975 F.2d 869 (Fed. Cir. 1992); *Cooper v. United States*, 11 Cl. Ct. 471, *rev’d on other grounds*, 827 F.2d 762 (Fed. Cir. 1987) (inevitably recurring flooding during spring, summer, and winter months for multi-year period).

significant resources to support Houston's recovery. It is impossible not to feel sympathy for Plaintiffs' losses. But the law does not support using the Fifth Amendment to recompense Plaintiffs for their losses. The Court should reject Plaintiffs' claims for the reasons discussed above and for the additional reasons to be addressed at trial.

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